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Inside there were six wicker gods with enormous frog-mouths and dugong-like bodies.

The Empress Augusta River, in German New Guinea, has been navigated for two hundred and twenty-four miles by Admiral von Schleinitz in the "Ottilie." The steam-launch proceeded one hundred and twelve miles farther, and returned from want of fuel. This was in the dry season.

GEOLOGY AND PALÆONTOLOGY.

Hummocks and Boulders of Decomposition in Southeastern Missouri.—Among the crystalline hills of Southeastern Missouri boulders of decomposition are frequently seen. In fact, it was owing to a small eminence—two hundred feet above the ancient broad Cambrian valley—being covered with detached boulders of iron ores that the name Iron Mountain derives its origin. From its surface it is said that seventeen million tons of iron boulders have been taken, these having been left behind by the removal, during long ages, of the intervening decomposed feldspathic rocks. Throughout the region the surfaces of the crystalline rocks are covered with their decayed remains to a depth from a few feet to fifty or seventy-five feet.

The rocks to which attention is here called are those of a knob, about five miles from Iron Mountain, rising out of a broad valley, where the quarries of Graniteville are situated, at an elevation above the sea of about twelve hundred feet, south of latitude 38° N.

The surface of the red granulite is commonly covered by its own material decomposed *in situ* to a depth of only a few feet. The decay is not always gradual from the surface inward, but frequently *per saltum*, leaving hard surfaces immediately below the more or less decomposed materials. But over an area of several acres these rocks are not covered with earthy matter. Here may be seen perfectly rounded or ellipsoid hummocks from twenty feet or less in width to forty or even one hundred feet. Some of the ridges are unbroken for a length of several hundred feet, while others are made up of a chain of hummocks, whose general trend as well as slope is southwest,—the same direction as that of the prevailing, but not numerous, joints shown in the adjacent quarries. Some of the parallel ridges or chains have flat, rounded surfaces, thus, , whilst others are like inverted U's, separated by narrow furrows from one foot to five feet or more in width, and from ten to twenty feet deep, thus, ∩∩∩∩, which represent deep weathering and removal along the lines of joints. These hummocks have perfectly the form of typical *roches moutonnées*—less only the frequent, although generally superficial, scratches—of modern glacier regions. In many places, upon what we may call the *roches moutonnées* of Graniteville, there are boulders, more or less rounded, still fitting into their original places, although the decayed connecting rocky matter has long since been removed. Most of the boulders have spheroidal or ellipsoidal forms, and resemble as much northern erratics, or perched blocks, as any seen within the drift zone of America or modern glacier regions of Europe. One of these boulders is about thirty feet long, fifteen feet broad, and twenty feet high, perched on top of a rounded hummock, and resting on only a few small points.

When one compares the forms of these rocks south of the line of northern drift, and of others similar in the more southern Appalachians, and reads of the same in warm countries, as Ceylon and Brazil on the one hand, and, on the other, with those of the Swiss valleys and the greater and more wide-spread rounded surfaces of Norway, still in contact with living glaciers,—where he may see how unimportant a factor is the land-ice in gnawing away the old crystalline rocks,—one is forced to look upon the structure of both as more or less of common origin,—atmospheric erosion, perhaps aided by currents,—although the latter region has been swept off by a brush of ice which has left scratches behind.—*J. W. Spencer, University of Missouri, Columbia, Mo.*

The Dinosaurian Genus Cœlurus.—This genus was described by Marsh, in 1871,[1] from material obtained in the Jurassic deposit of Wyoming Territory. Characteristic bones not distinguishable as to genus from those described by Marsh are in my collection from New Mexico, probably from beds of Triassic age. They consist of nearly all parts of the skeleton, excepting jaws and teeth, and but little of the skull is determinable. The material is much more complete than that described by Marsh.

The remains show that the genus Cœlurus is a Dinosaurian, and I cannot agree with Professor Marsh's view "that Cœlurus cannot be placed in any known order."[2] The ilium has the general character of that of the carnivorous suborder (Goniopoda), and the other parts of the skeleton confirm this reference. Such is the possession of compressed, strongly-curved claws, which were capable of very extensive flexion and extension. Cœlurus is in fact allied to Megadactylus (Hitchcock) from the Trias of Massachusetts, differing principally, so far as determinable, in the form of the condyles of the femur. They are simple in Cœlurus, but in Megadactylus the external condyle has the double character seen in Megalosaurus.[3]

The vertebræ are all of slender proportions, especially those of the neck and tail. These, with most of the bones of the

[1] Amer. Journal Sci. Arts, p. 339, Plate X.

[2] L. c., p. 340.

[3] See Cope, Trans. Amer. Philosoph. Soc., xiv., 1870, Plate XIII.

limbs, are hollow, having large central cavities surrounded by thin walls, as in Megadactylus. There are four sacral vertebræ. The phalanges are elongate. The anterior caudal vertebræ only have chevron bones. These have escaped Professor Marsh, who says they are wanting; but he does not appear to have possessed the most anterior of the series. In neither species is there a distinct third trochanter of the femur, but there is, not far below the great trochanter on the anterior face, a low, longitudinal, ridge-like angle. The femoral condyles have but little anteroposterior extent, which implies but little flexure of the knee. The humerus is a good deal smaller than the femur, but the disproportion is not so great as in Lælaps.

The form seems to have been that of a terrestrial reptile which walked readily on the hind legs, and was probably a great leaper. The extremely long neck is a striking peculiarity, giving proportions to the body about like those of the swan. The habits were probably predaceous and carnivorous.

Two species are indicated by my collections, as follows:

Cœlurus longicollis. Cervical vertebræ one-third longer than those of *C. fragilis* Marsh; the sides of the centrum not sulcate; the anterior articular face of an anterior centrum not convex. The faces are oblique, showing that the head was carried above the level of the body. The caudal vertebræ were all quite slender, indicating the length of the tail.

Length of body of cervical vertebra		.063
Diameters of posterior cup	vertical	.016
	transverse	.019
Length of centrum of dorsal vertebra		.042
Diameters of posterior face	vertical	.020
	transverse	.021
Length of caudal centrum		.051
Diameters of posterior face	vertical	.023
	transverse	.021
Length of femur		.215
Diameters of condyles	antero-posterior	.024
	transverse	.030

This reptile was about the size of a greyhound.

Cœlurus bauri.[1] In this species the sides of the cervical centra are deeply and widely grooved on the posterior half, and the superior face of the neural arch is strongly grooved on each side on the anterior half. The size is much inferior to that of the *C. longicollis.* The femur is not so strongly grooved at the third trochanteric ridge.

Diameters of cervical centrum behind	vertical	.0115
	transverse	.013
Length of sacrum		.073
Diameters of anterior sacral centrum in front	vertical	.014
	transverse	.015
Transverse diameter of femoral condyles		.022

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[1] Dedicated to Dr. George Baur, the distinguished comparative anatomist of New Haven.

The horizon from which these species were obtained is probably upper Trias. It becomes, therefore, important to re-examine the locality from which Professor Marsh obtained the *Cœlurus fragilis* to determine whether its deposit is really of Jurassic age, as stated by Marsh. It is, however, not fixed beyond doubt that the New Mexican locality is Triassic.—*E. D. Cope.*

Geological News. GENERAL.—M. Nouvy, in his "Geology of Jersey," assumes that the island had an original granitic crust on which the gneisses were deposited in an intensely heated ocean. The sedimentary rocks are chlorite-schist, feldspathic schist (which is most common), metamorphic schist, and conglomerate. There is much eruptive rock, varying from granitic to diorite. The author states that the age of the true granites now found cannot be proved, but that the other eruptive rocks are certainly later than the schists. No sedimentary rock exists between these Cambrian strata and the conglomerate, which he attributes to the Permian age. After a careful sifting of the evidence, he concludes that subsidence has occurred only since the Roman occupation, and that Jersey was probably still joined to Normandy in the sixth century.

DEVONIAN.—M. Ch. Deperet has studied the Devonian of the eastern chain of the Pyrenees. This formation forms a narrow band running 15° north of east, parallel to the general direction of the chain. The belt can be traced across the basins of the Aude and the Tet, from the elevated valley of the Aniège on the west to the plain of Reussillon on the east, and has a length of sixty kilometres, with a width of five kilometres at the mountain-mass of Villefranche. The western part of this Devonian crest is nearly uninterrupted, but the eastern part is cut up into fragments and thrown northwards by the granite-mass of Canigon.

MESOZOIC.—Dr. Carl Diener has published a monograph upon the geology of the Lebanon. He has worked out the numerous lines of faulting and flexuring which have occurred, mainly during the Miocene, in the strata, which, both in the Lebanon and Anti-Lebanon, are chiefly Cretaceous and Eocene Limestones. Jurassic beds occur in a narrow belt at the western base of Mount Hermon, which is to a great extent built upon the line of a great fault that coincides with its western base. The limestone beds of this mountain belong to the age of the Lower Chalk of Europe, and are disposed in the form of a low arch with a north-northeast axis. There are other faults on the south and east flanks. Doubtless the system of disturbance here is identical with that which caused the Jordan-Arabah depression; and the main line of fault of that depression enters the valley of the Leontes at the western base of Hermon. Here the Lebanon Limestone and other Lower Cretaceous beds are nearly vertical and in contact with horizontal Upper Cretaceous beds. Dr. Diener throws some doubt on the former existence of glaciers in the district because he cannot find glacial striations.

Professor Owen recently read before the Geological Society of London a paper upon *Galesaurus planiceps* Owen. The characters of the skull and teeth have been brought to light. The reptilian nature of the fossil is indicated by the single occipital condyle and other features. The angle of the jaw is not produced beyond the articular element. In general shape and bony strength the mandible of Galesaurus resembles that of a mammal. The crowns of four upper molars are triangular, the base is flanked by a short cusp before and behind, and the corresponding margins are finely crenulate. The incisors are eight in each jaw and partially interlock. The canines resemble those of a mammal. No trace of successional teeth was found. The teeth are implanted firmly in sockets. The author remarked on the earlier reptilian character exhibited by the oolitic mammal Amphitherium and by the existing Myrmecobius. The specimens are from the Triassic of South Africa.

The Triassic age of the Hawkesbury sandstone formation, New South Wales, has been proved by the discovery of a Mastodonsaurus.

CÆNOZOIC.—Among some fossils from Wadi Halfa, Nubia, is an upper right-cheek tooth of an Equus of Pliocene type, allied to the group containing *E. sivalensis.*

M. A. Gaudry maintains the Miocene age of the Pikermi fauna, and M. Deperet has contributed to the French Academy a note upon the importance of the Pliocene beds in the south of France. It comprises twenty metres of drift, above which are one hundred metres of marine beds, while still higher there are one hundred and fifty metres of beds of continental formation. The beds of the Val d'Arno are above these, and have a very distinct fauna.

POSTPLIOCENE.—The Naulette jaw found in a cavern near Dinant (Belgium) is remarkable for its excessive prognathism. The study of it has led M. Topinard to conclude that in the age of the mammoth and tichorhine rhinoceros there were numerous mixed human races, to one of the lowest of which this jaw belonged.

M. A. Gaudry, who in July last called the attention of the French Academy to the exceptional riches of the grottoes of Mentone, in which had been collected not less than forty thousand shells belonging to one hundred and seventy-one species, has recently stated that the same grottoes contain the bones of forty-two species of birds, fourteen of them birds of prey, the others the food-birds of the primitive race who inhabited the caves. One species only is extinct, but many have disappeared from the region they then inhabited. The quail, which is now common on the Mediterranean coasts, is seen in the Mentone grottoes.

The batrachians of the Mentone grottoes are a species of toad, which no longer exists in France, and in dimensions is near the large *Bufo agua* of South America, and a frog, while seven species of fish occur, one extinct and six still living. The extinct species belongs to Strophodus, a Jurassic genus of sharks. Among the recent species are the maigre, tunny, salmon, and trout. Altogether, in the six caverns once inhabited by quaternary man, M. Gaudry reports eight hundred and forty thousand fragments, vertebrate and invertebrate, belonging to one hundred and eleven species of the former category and one hundred and seventy-one of the latter.

RECENT.—Professor J. D. Dana, in a recent article in the *American Journal of Science*, concludes, in connection with the recent disturbances at Kilauea, Vesuvius, and Tarawera, that volcanic action must be attributed to the hydrostatic pressure of the column of lava; the pressure of vapors escaping in underground regions from the lavas, or produced by contact with them, acting either quietly or catastrophically; and the pressure of the subsiding crush of the crust forcing up the lavas in the conduit.

MINERALOGY AND PETROGRAPHY.[1]

Petrographical News.—The rocks occurring in equatorial Eastern Africa (Massai-Land) have been found by O. Mügge[2] to embrace granophyres, gneisses, mica schists, and amphibolites among the older rocks, and liparites, trachytes, nephelinites, nepheline-tephrites and basanites, limburgites, melilite-basalts, augite andesites and feldspathic basalts among the younger ones. The granophyres contain an augite with partings parallel to $\infty P\overline{\infty}$ and $0P$, hypersthene and hornblende, all of which are so closely and peculiarly associated that the author thinks they might be due to the solution in the granophyre substance of some foreign inclusion. The gneisses, schists, and amphibolites also contain a diallagic and an orthorhombic augite. Among the granular constituents of two specimens of amphibolite, prismatic crystals of scapolite were noticed. The porphyritic feldspathic constituent of the trachytes (acmite-trachytes) corresponds very closely to the soda-microcline of Förstner.[3]

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[1] Edited by Dr. W. S. BAYLEY, Madison, Wisconsin.

[2] Neues Jahrb. fr. Min., etc., Beil. Bd., iv. p. 576.

[3] *Cf.* American Naturalist, Notes, June, 1885, p. 600.